U.S. FISH AND WILDLIFE SERVICE
SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM

SCIENTIFIC NAME: *Calochortus persistens*

COMMON NAME: Siskiyou mariposa lily

LEAD REGION: Region 8

INFORMATION CURRENT AS OF: April 22, 2010

STATUS/ACTION:

___ Species assessment - determined we do not have sufficient information on file to support a proposal to list the species and, therefore, it was not elevated to Candidate status
___ New candidate
_X_Continuing candidate
___ Non-petitioned
_X_ Petitioned - Date petition received: 9-10-01
__ 90-day positive - FR date:
__ 12-month warranted but precluded - FR date:
__ Did the petition request a reclassification of a listed species? No

FOR PETITIONED CANDIDATE SPECIES:
a. Is listing warranted? Yes
b. To date, has publication of a proposal to list been precluded by other higher priority listing actions? Yes
c. If the answer to a. and b. is yes, provide an explanation of why the action is precluded. Higher priority listing actions, including court-approved settlements, court-ordered and statutory deadlines for petition findings and listing determinations, emergency listing determinations, and responses to litigation, continue to preclude the proposed and final listing rules for the species. We continue to monitor populations and will change its status or implement an emergency listing if necessary. The "Progress on Revising the Lists" section of the current CNOR (*http://endangered.fws.gov/*) provides information on listing actions taken during the last 12 months.

___ Listing priority change
Former LP: __
New LP: ___
Date when the species first became a Candidate (as currently defined): 6-13-02

___ Candidate removal: Former LPN: ___
___ A - Taxon is more abundant or widespread than previously believed or not subject to

the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status.

___ U – Taxon not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status due, in part or in total, to conservation efforts that remove or reduce the threats to the species.

___ F - Range is no longer a U.S. territory.

___ I - Insufficient information exists on biological vulnerability and threats to support listing.

___ M - Taxon mistakenly included in past notice of review.

___ N - Taxon may not meet the Act's definition of "species."

___ X - Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY: Flowering Plant; Family: Liliaceae

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: California and Oregon

CURRENT STATES/ COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE: Siskiyou County, California and Jackson County, Oregon

LAND OWNERSHIP:
Of the nine known populations on Gunsight-Humbug Ridge in California, seven are entirely located on the Scott/Salmon Ranger District of the Klamath National Forest. Two other populations are found on both Federal and private lands in California (U.S.D.I. and U.S.D.A. 2006, p. 7, 33). A recently discovered occurrence on Cottonwood Peak and Little Cottonwood Peak, Siskiyou County, California is located on both Klamath National Forest and privately owned lands (Frank Callahan, Callahan Seeds, 2007). The Oregon occurrence is entirely within the Ashland Resource Area, Medford District of the Bureau of Land Management (Klamath-Siskiyou Wildlands Center 2001).

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LEAD FIELD OFFICE CONTACT: Yreka Fish and Wildlife Office, Nadine R. Kanim 530-842-5763, Nadine_Kanim@fws.gov

BIOLOGICAL INFORMATION:

Calochortus persistens (Siskiyou mariposa lily) is an herbaceous perennial flowering plant with a single, wide, basal leaf, arising from a bulb. The persistent basal leaf is approximately 20 centimeters (cm) (7.9 inches (in)) in length and the stem approximately 10 cm (3.9 in) high. One to two large showy, pink to lavender, erect, bell-shaped flowers have a yellow fringe above the

nectary at the base of the petals. Below the nectary on each of the three petals is a wide ciliate membrane. Sepals and petals are both 35 millimeters (mm) (1.4 in) to 40 mm (1.6 in) in length. The nodding three-winged fruit are approximately 1 cm (0.4 in) long and remain covered by the persistent sepals and petals (Hickman 1996, p. 1188; Overton 1979; Ownbey 1940, pp. 449-450). Ownbey (1940, p. 450) described *C. persistens* as a new species from the type specimen collected by E.L. Greene (#903) on June 30, 1876, from the "mountains near Yreka", Siskiyou County, California. Hickman (1996, p. 1188) continues to recognize this species as it was named in 1940.

Photograph by Clifton A. Ground, used with permission from the U.S.D.A. Forest Service, Klamath National Forest, Yreka, California

Calochortus persistens, a narrow endemic, is restricted to three disjunct ridge tops in the Klamath-Siskiyou Range, on the California-Oregon border. Until recently, only two extant occurrences were known: the type locality on Gunsight-Humbug Ridge, west of Yreka, Siskiyou County, California, and the Bald Mountain site, west of Ashland, Jackson County, Oregon.

In July 2006, as part of a timber harvest review conducted by California Department of Fish and Game staff, a new locality for *C. persistens* was discovered (Knight 2006a, Fallscheer 2007) on Cottonwood Peak and Little Cottonwood Peak, Siskiyou County, California. A botanical survey conducted by Callahan (2007) in May 2007, confirmed *C. persistens* populations on the east slopes of these two peaks and one unnamed peak on the ridge between Cottonwood Peak and

Little Cottonwood Peak.

Botanical surveys conducted in 2008, on Observation Peak in the Klamath National Forest in Jackson County, Oregon, were unsuccessful in relocating *Calochortus persistens*, which previously had been informally reported from this locality (Callahan 2007; Amsberry and Meinke 2010, p. 5.; Knight 2010a). *Calochortus persistens* is thought to have been extirpated from Observation Peak.

In the southern-most occurrence in California, *Calochortus persistens* is found at nine separate sites on approximately 10 hectares (ha) (24 acres (ac)) of Klamath National Forest and privately-owned lands that stretch for 6 kilometers (km) (4 miles (mi)) along the Gunsight-Humbug Ridge. The newly discovered Cottonwood Peak and Little Cottonwood Peak locality consists of 50,000 to 100,000 plants on 164 ha (405 acres), which are distributed on three individual peaks in the Klamath National Forest and on private lands (Callahan 2007; Knight 2009a,b; Knight 2010a). The Oregon occurrence was described in 1998, as five plants in an area of a few square feet on Bureau of Land Management lands (Klamath-Siskiyou Wildlands Center 2001, pp. 6, 11).

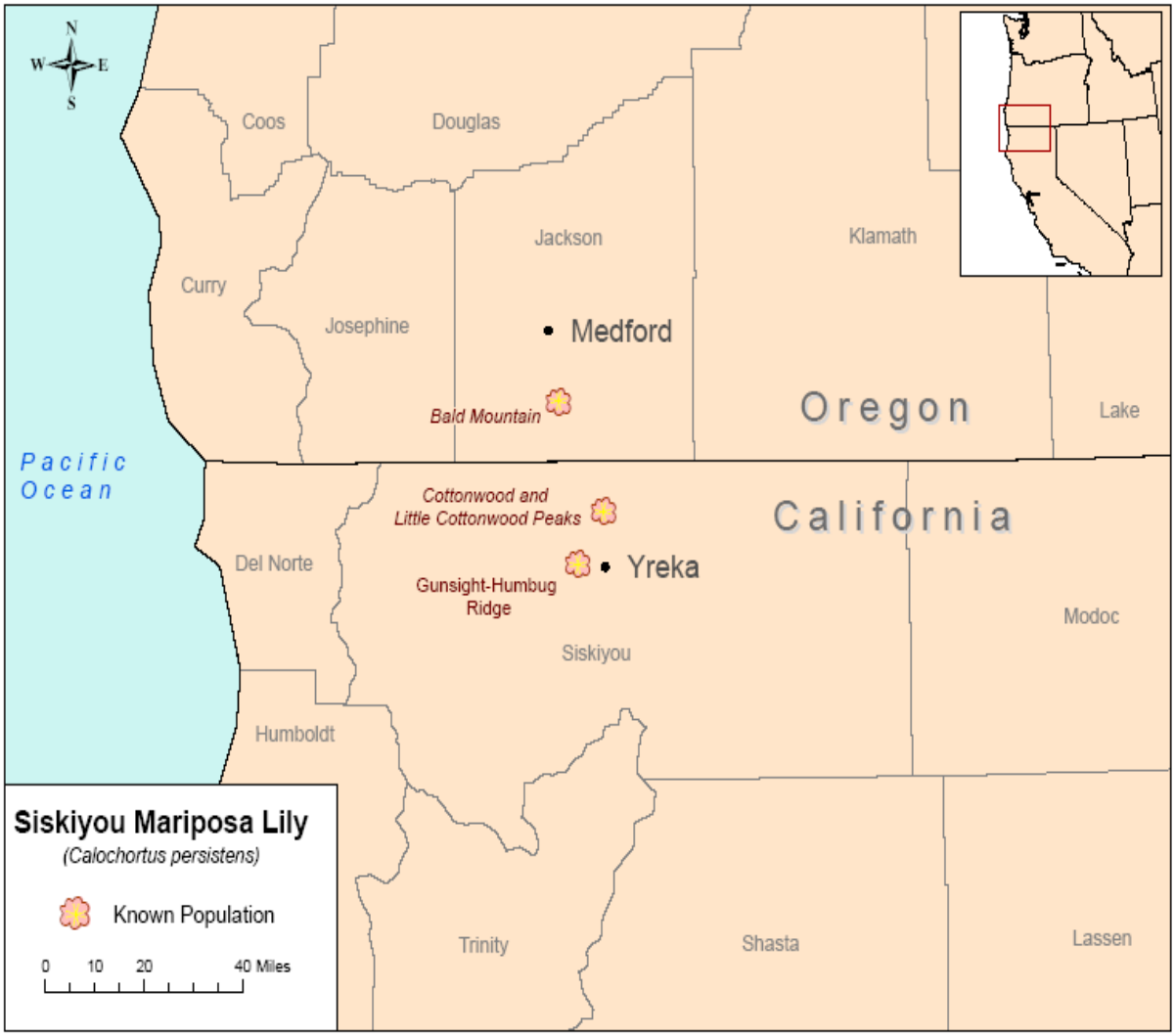
On Gunsight-Humbug Ridge in California, *Calochortus persistens* occurs at elevations of 1,310 meters (m) (4,300 feet (ft)) to 1,847 m (6,060 ft) on ridgeline rock outcrops and talus, where the soils are shallow, dry, rocky, and acidic (Knorr 1987, p. 3; Klamath-Siskiyou Wildlands Center 2001, p. 7). These soils are well-drained early in the season after snow melt. *Calochortus persistens* plants are found in greater numbers on north-facing slopes and are not found very far down off the ridge (Knorr 1987, p. 3). Soils on Gunsight-Humbug Ridge are of metamorphic origin and belong to the Jayar Family/Woodseye Family Association (Klamath National Forest 1987, p. 70; Klamath-Siskiyou Wildlands Center 2001, p. 7). In the Cottonwood Peak and Little Cottonwood Peak locality, *C. persistens* plants are found on all slope exposures from 1,300 m (4,300 ft) to 1,829 m (6,000 ft) in elevation (Callahan 2007). In Oregon, *C. persistens* is found at 1,585 m (5,200 ft) in McMullin Rock Outcrop Complex soils.

Calochortus persistens plants occur in openings where there is little vegetative cover and the litter layer is shallow or absent. Dominant shrubs are *Cercocarpus ledifolius* (curl-leaf mountain mahogany) and *Cercocarpus betuloides*. *Berberis aquifolium* var. *repens* (Oregon-grape), is another associate that can sometimes be dominant. Other common shrub species in the vegetative community are: *Lupinus albifrons* var. *collinus*, *Quercus garryana* var. *breweri*; *Prunus emarginata* (bitter cherry), *Chrysothamnus nauseosus* (rubber rabbitbrush), *Ceanothus integerrimus* (deer brush), and *Garrya* sp. (silk tassel bush) (Knorr 1987, p. 3; Knapp 1996, p. 3). Down slope from this open shrubby vegetative community where *C. persistens* occurs, is mixed coniferous forest, dominated by *Pinus ponderosa* (ponderosa pine), *Pseudotsuga menziesii* (Douglas-fir), and *Calocedrus decurrens* (incense cedar).

In California, Klamath National Forest botanists have conducted surveys for *Calochortus persistens* on the Gunsight-Humbug Ridge in 1980, 1981, 1982, 1987, 1992, 1995, 2003, and 2009 (Knorr 1987, Appendix C; Klamath National Forest 2005, p. 5; Knight 2010b). While the 2009 survey data have not been completely analyzed, a greater number of juvenile and adult

plants were counted this year than in previous years because of the timing of the survey. By starting earlier in the season, juvenile and adults could be counted before the leaves senesced (Knight 2010b). In the years before 2003, the extent of each population surveyed and the number of populations surveyed were inconsistent. In addition, many botanists have noted extreme variation in the number of plants counted from year to year, presumably as a result of environmental factors and survey timing (Overton 1979; Knorr 1987, p. 3; Klamath-Siskiyou Wildlands Center 2001, p. 10; Knight 2010b). Klamath-Siskiyou Wildlands Center (2001, p. 11) reported that in June 1995, all known California locations had been surveyed (in coordination with the Klamath National Forest) and estimated a total California population of 3,000 plants. More than 3,671 *C. persistens* plants were counted on Federal and some private lands in 2003 (Klamath National Forest 2005, p. 5). Juvenile plants of all ages, indicated by single leaves of varying widths, were evident in all populations in the 2003 Klamath National Forest survey (Klamath National Forest 2005, p. 2). In his 2007, survey of all but a small densely populated portion of the entire Cottonwood Peak and Little Cottonwood Peak occurrence, Frank Callahan estimated a total count of approximately 17,900 juvenile and adult lilies (Knight 2009a).

Knapp (2002) reported that she had seen four *C. persistens* plants at the Oregon site. These were the first plants reported from that area since the occurrence was discovered in 1998 (Klamath-Siskiyou Wildlands Center 2001, p. 11). In 2003, only one plant was found in Oregon but in 2005, all five plants were found at this site (Tong 2004, 2005a). During the 2006 field season, two plants were counted at the Oregon site, in 2007 only one plant was found, and in 2008 two plants were counted (Tong 2006, 2008a, 2008b).



THREATS:

A. <u>The present or threatened destruction, modification, or curtailment of its habitat or range</u>.

Major threats include the introduction of exotic weeds and grasses; fire suppression resulting in increased fuel loading and shading and competition by native and non-native species; fragmentation by roads, fire breaks, tree plantations, and radio-tower facilities; maintenance and construction around radio towers and a telephone relay station located on Gunsight Peak and Mahogany Point; and soil disturbance and exotic species introduction as a result of heavy recreational use and fire break construction (Knorr 1987, p. 3-4; Knapp 1995, p. 5; Knapp 1996, p. 9-11; Klamath-Siskiyou Wildlands Center 2001, p. 15-16). In 2000, *Isatis tinctoria* (dyer's woad), a germination inhibitor (Young and Evans 1971, p. 2-3), was reported to have spread throughout the California occurrence (Klamath-Siskiyou Wildlands Center 2001, p. 16). In 2001, U.S. Forest Service (Forest Service) staff considered that dyer's woad affected 90 percent of the known *C. persistens* habitat in California (Boland 2001). A biennial, with a deep taproot,

dyer's woad forms dense rosettes in infested areas. Dyer's woad is thought to prevent *C. persistens* seedling establishment by competing for space, water, and nutrients. Both Forest Service staff (Detrich 2001) and Klamath-Siskiyou Wildlands Center (2001, p. 15-16) cited competition with dyer's woad as a significant and chronic threat to the survival of *C. persistens*. After extensive surveys in 2003, Forest Service staff determined that approximately 75% of all *C. persistens* habitat on Gunsight-Humbug Ridge was infested with dyer's woad (U.S.D.I. and U.S.D.A. 2006, p. 10). In 3 of the 33 subpopulations, 10 percent of *C. persistens* habitat was covered by this exotic weed. In the remaining 26 subpopulations, where dyer's woad occurred, the infestation did not exceed 5 percent of the habitat. Dyer's woad was not found in 4 of the 33 subpopulations on Gunsight-Humbug Ridge, presumably because absence of ground disturbance has kept it from becoming established (Knight 2004; U.S.D.I. and U.S.D.A. 2006, p. 10).

The Gunsight-Humbug Ridge has one of the highest rates of lightning strikes and small fire ignitions on the Klamath National Forest (Knapp 1996, p. 10). However, as a result of fire suppression, the last large fire in the area was the 1955 Haystack Fire. Fire suppression has resulted in shading and competition by native species including curl-leaf mountain mahogany and Oregon grape (Knapp 1995, p. 8). Conifers appear to be encroaching as well (Knapp 1996, p. 10). In addition to reducing habitat suitability through shading and competition, fire suppression may have resulted in an increased fuel load that could result in destruction of habitat in localized areas, should a high-intensity fire occur.

Direct destruction of plants and habitat has occurred as a result of site maintenance around the Gunsight Peak radio installation in spring 2000 (Klamath-Siskiyou Wildlands Center 2001, p. 16) and snow plowing to replace a power pole in the winter of 1999/2000 (Boland 2001). Road grading and controlled burning may also result in direct destruction of plants and habitat (Boland 2001; Klamath-Siskiyou Wildlands Center 2001, p. 16).

In 2009, the Klamath National Forest proposed two projects on Gunsight-Humbug Ridge. Construction and maintenance of a new 120-foot electronic tower will require a 30-year lease. The tower will replace an existing structure and measures to avoid destruction of *Calochortus persistens* plants and prevent the spread of weeds will be implemented (Kanim 2009). The McBaldy Project is a fuels reduction project that will involve timber harvest within the northwest portion of the *Calochortus persistens* Special Habitat Management Area. Although the Klamath National Forest Land and Resource Management Plan Standards and Guidelines prohibit any ground disturbance that would adversely affect known *C. persistens* habitat by introducing weedy species, the proposed action includes several mitigation measures that will prevent weed introduction or spread from existing sites, including monitoring and immediate control by hand pulling in newly discovered noxious weed sites (Knorr 2009, p. 4).

No private property development proposals in the area of the *Calochortus persistens* populations on Gunsight-Humbug Ridge are on file with the Siskiyou County Planning Department (Hickel 2010). However, Siskiyou County Planning Department has approved the replacement of a cell tower on private lands near Gunsight Peak in 2009. Since 2001, only one private property owner has indicated an interest in erection of new cell towers on potential *C. persistens* habitat (Detrich 2001). None of the private property owners contacted in 2001 had immediate plans for

development in the area.

In 2005, Bureau of Land Management (BLM) staff discovered that an unauthorized off-road vehicle trail had been established on the ridge above the Oregon occurrence (Tong 2005b). Brush had been removed from this new trail and flagging put up to mark the trail route. Recently, an additional unauthorized, lightly used trail has been developed and marked near the Oregon occurrence (Tong 2008b). Occasional recreational use of this trail is evident (Mousseaux 2010). While direct destruction of *Calochortus persistens* plants has not occurred, the trails could result in increased access to the plants or introduction of exotic species by off-road vehicles. These two instances of unauthorized resource damage were reported to law enforcement agents in 2005 and BLM recreation staff in 2008 (Tong 2005b, 2008b).

In 2007, Callahan (2007) noted invasive weeds in association with timber harvest activity, especially adjacent to logging roads in the Cottonwood Peak and Little Cottonwood Peak occurrence. In 2009, timber harvest and associated activities were being carried out in two locations in this area (Fallscheer 2009). Post-harvest compliance monitoring has not been completed by Department of Fish and Game staff (Fallscheer 2010), although at least 0.8 km (0.5 mi) of new road has been constructed this past year in an area where dyer's woad had already invaded (Knight 2010a). No other private property development proposals for the Cottonwood Peak and Little Cottonwood Peak occurrence have been filed with the Siskiyou County Planning Department this year (Hickel 2010).

During botanical surveys on Observation Peak in Oregon, Callahan observed that the amount of habitat disturbance caused by cattle grazing may have contributed to the extirpation of *Calochortus persistens* on Observation Peak (Amsberry and Meinke 2010, p. 11).

B. Overutilization for commercial, recreational, scientific, or educational purposes.

Knapp (1995, p. 5) listed bulb collection as an occasional threat to this species. In 1979 and 1982, the Klamath National Forest reported that there was some evidence that *C. persistens* bulbs may have been removed on Federal lands (Knorr 1987, Appendix E). At present, horticultural theft is not known to be a significant threat to the Gunsight-Humbug Ridge (Knorr 2002) or either of the other occurrences.

C. Disease or predation.

Deer, rodent, and insect herbivory is common and causes significant losses to leaves, buds, flowers, and fruits (Knorr 1987, p. 4; Knapp 1996, p. 8; Klamath-Siskiyou Wildlands Center 2001, p. 13; Callahan 2007). In a 1995 to 2000 demographic study, no seeds matured in 4 out of 6 years, due in large part to predation on reproductive structures (Klamath-Siskiyou Wildlands Center 2001, p. 12). In 2007, at several sites where dense *C. persistens* populations occur in the Cottonwood Peak and Little Cottonwood Peak locality, Callahan (2007) found that herbivores had consumed approximately 98 percent of both plants and seed capsules. In 2008, Callahan observed that cattle grazing may have contributed to the extirpation of *Calochortus persistens* on Observation Peak (Amsberry and Meinke 2010, p. 11).

D. The inadequacy of existing regulatory mechanisms.

Calochortus persistens was listed in July 1982 by the State of California Fish and Game Commission as a rare species under the California Native Plant Protection Act (CNPPA) (Chapter 10, section 1901 *et seq.*, California Fish and Game Code, and Title 14, California Code of Regulations 670.2). The CNPPA prohibits the taking, possessing, or selling of plants listed under this act, though there are exceptions to these prohibitions. In the past, the CNPPA has not provided adequate protection for plants listed under this statute from the impacts of habitat modification, land use changes, or invasion of habitat by exotic species.

The Forest Service has issued "Botanical Investigation and Management Guidelines for *Calochortus persistens*" (Knorr 1987, Appendix E) and has designated 40 ha (1000 ac) as Special Habitat for *C. persistens* (U.S.D.A 1995, p. 4-111-112). While the management goals set forth in the Klamath National Forest Land and Resource Management Plan must be implemented, at the time *C. persistens* was added to the candidate list, there were no funds directly allocated to specific projects to reduce or eliminate dyer's woad (Stresser 2002). In their petition to list this species, Klamath-Siskiyou Wildlands Center (2001, p. 15, 17) cited the fact that the management guidelines had not been implemented as one of the threats to survival for this species. Existing regulatory mechanisms have not protected *C. persistens* from existing threats and are inadequate to ensure this species' survival and recovery.

E. Other natural or manmade factors affecting its continued existence.

Unpublished data from a five-year demographic study conducted within thirteen 5-meter by 0.5-meter transects showed that none of the seedlings established in 1995 survived to 2000, suggesting no survival for an entire year's reproduction (Klamath-Siskiyou Wildlands Center 2001, p. 12). The reproductive rate based on conditions from 1995 to 1996 was high compared to those averaged over the period from 1995 to 2001 (Knapp undated, p. 2, 3, 4). However, even during the period from 1995 to 1996, when the reproductive rate appeared to be relatively high, only 20 percent of buds produced in transects matured to distribute seeds (Knapp 1996, p. 7). There is no evidence of asexual reproduction by bulbils or bulblets and plants don't begin to flower until they are about 8 to 10 years of age (Knapp 1996, p. 7; Klamath-Siskiyou Wildlands Center 2001, p. 12).

CONSERVATION MEASURES PLANNED OR IMPLEMENTED:

In 1982, Klamath National Forest issued its "Botanical Investigation and Management Guidelines for *Calochortus persistens*" (Knorr 1987, Appendix E). These guidelines prohibit new ground-disturbing activities within 100 m (330 ft) of the Gunsight-Humbug Ridge, restrict vehicles to existing roads, prohibit the use of heavy equipment to maintain fuel breaks, prohibit implementation of activities before a Forest Service botanist is consulted, require installation of a deer-proof fence around a 0.8 ha (2 ac) area, and require monitoring of *C. persistens* populations. The Klamath National Forest Land and Resource Management Plan established a 40 ha (1000 ac) Special Habitat Management Area for this species where currently known and newly discovered *C. persistens* habitat must be managed to maintain a viable population and where

non-native species must be reduced or eliminated. The Klamath National Forest conducted population surveys between 1980 and 1995 (U.S.D.I. and U.S.D.A. 2006, p. 8, 33) and funded a one-year demographic study of this species in the mid-1990's (Knorr 2002). In 1990, Forest Service staff attempted a small dyer's woad removal project. As a result of this test, the Forest Service concluded that hand removal is too time consuming and effort-intensive to be a viable eradication option (Knorr 2002).

The Klamath National Forest and Fish and Wildlife Service have nearly finalized a conservation strategy for this species. In 2003, under contract with the Fish and Wildlife Service, Klamath National Forest staff mapped the entire known range of *C. persistens* on Gunsight-Humbug Ridge in California, using Global Positioning System technology (Klamath National Forest 2004, p. 2). The extent of dyer's woad invasion adjacent to and within *C. persistens* populations was mapped on paper. During the mapping effort, dyer's woad was manually removed from approximately one percent of *C. persistens* habitat, where infestation was sparse and where disturbance to *C. persistens* plants could be avoided. Dyer's woad was also manually clipped along 5.6 km (3.5 mi) of the road that provides access to the Gunsight-Humbug Ridge (Klamath National Forest 2004, p. 2-3). In 2003, the roads and areas around radio towers and buildings on the Mahogany Point administrative site also were manually treated for dyer's woad by clipping. Plots for different weed treatments were established at this administrative site in 2003 and weed treatment experiments were carried out from 2004 to 2006 (Klamath National Forest 2005, p. 1-2; Knight 2005, 2006b). The results of this experiment were presented in a poster at the 2009 California Native Plant Society Conservation Conference. In 2004, 2005, and 2006, work continued with the Klamath National Forest on the development of a conservation agreement for *C. persistens*. In addition, manual treatment of dyer's woad along the Gunsight-Humbug Ridge Road was completed: 8.8 km (5.5 mi) in 2004, 9.6 km (6 mi) in 2005, and 9.6 km (6 mi) in 2006 (Knight 2006b). In 2005, dyer's woad was manually removed from about 2.2 ha (5.5 ac) of land adjacent to occupied *C. persistens* habitat. In 2006, a total of 8.1 ha (20 ac) of Federal lands was manually treated for dyer's woad, including roadside treatments (Knight 2006b). In addition, the Siskiyou County Department of Agriculture chemically treated 4.4 ha (11 ac) on private lands on Gunsight-Humbug Ridge (Knight 2006b). Finally, a draft conservation agreement among the Klamath National Forest, Bureau of Land Management, and Fish and Wildlife Service was circulated for review in December 2006, by Federal and State agency staff, the Siskiyou-Wildlands Center, and other interested parties. Currently, the draft conservation agreement is being revised based on comments received from several reviewers.

Through a 2007 implementing agreement funded by the Fish and Wildlife Service, the Klamath National Forest has accomplished the following conservation actions on Gunsight-Humbug Ridge this year: (a) manual treatment of dyer's woad along 9.6 km (6 mi) of road resulting in a total of 9.7 ha (24 ac) treated; (b) manual treatment on Federal lands of 46.8 gross (effective) ha (120 ac) of habitat adjacent to and between *Calochortus persistens* populations, thereby increasing the total area treated by 32.4 ha (80 ac) over the year before; (c) ongoing verification of electronic site permit status in an attempt to reduce use that may lead to continued introduction of dyer's woad; and (d) effective coordination with the California Department of Forestry to avoid potential effects to *C. persistens* of fire suppression related to the China Back Fire (Klamath National Forest 2007, p. 2-4). In addition to these actions, the Forest Service funded

surveys for off-road vehicle damage on Gunsight-Humbug Ridge, instituted an emergency road closure, erected signs to prevent further off-road vehicle damage in the area, and chemically treated the Mahogany Point and Gunsight Peak administrative sites under a cooperative agreement with the Siskiyou Department of Agriculture.

In 2008, under a Partners for Fish and Wildlife cooperative agreement funded by the Fish and Wildlife Service, the Siskiyou County Department of Agriculture chemically treated 138 gross ha (340 ac) of private lands on Gunsight-Humbug Ridge and along the access roads to the Cottonwood Peak and Little Cottonwood Peak occurrence. Through an implementing agreement funded by the Fish and Wildlife Service, the Klamath National Forest accomplished several conservation actions, including (a) manual removal of dyer's woad from 7.2 km (4.5 mi) out of 9.6 km (6 mi) of road along Gunsight-Humbug Ridge, (b) manual removal of dyer's woad on Federal lands from 124 acres of habitat adjacent to and between *Calochortus persistens* populations, (c) discovery of a new subpopulation below Gunsight-Humbug Ridge, (d) seeding native perennial grasses before the fall rains in the chemical treatment areas on private lands around Gunsight Peak, and (e) initiation of *C. persistens* seed collection for long-term conservation storage, under an agreement with the California Department of Fish and Game (Knight 2009b). In addition to this work, the Klamath National Forest funded a survey of the Cottonwood Peak and Little Cottonwood Peak occurrence and has digitized this information in a Geographic Information System map. *Calochortus persistens* was added to the State of Oregon's candidate species list in 2008 (Amsberry 2009).

Siskiyou County Department of Agriculture repeated chemical treatment of 138 gross ha (340 ac) of private lands on Gunsight-Humbug Ridge in 2009, under a Partners for Fish and Wildlife cooperative agreement. Repeated treatments are needed to reduce the residual weed seed bed and have been very successful in controlling dyer's woad in this area (Aceves 2009, p. 3). In addition, Siskiyou County Department of Agriculture staff chemically treated three infestations mapped by Frank Callahan in his 2008 survey and several others in the Cottonwood Peak and Little Cottonwood Peak areas, resulting in a total of 40.5 gross ha (100 ac) treated in 2009 (Aceves 2010, p. 4; Knight 2010a).

In May through July of 2009, the Klamath National Forest funded and conducted a full population census of the *Calochortus persistens* population on Gunsight-Humbug Ridge. The purpose of this census is to compare the size and extent of the *C. persistens* occurrence with that measured in the 2003 baseline survey and to compare the density and extent of the *Isatis tinctoria* infestation (Knight 2010b). Through an implementation agreement with the Fish and Wildlife Service, the Klamath National Forest manually removed dyer's woad from 9.6 km (6 mi) of road along Gunsight-Humbug Ridge and from 24.5 ha (60.4 ac) of habitat on Federal lands adjacent to and between *C. persistens* populations (Knight 2010b,c). Areas on private lands that were seeded with perennial grasses in 2008, were monitored to determine if reinvasion by weeds could be prevented after chemical treatment (Knight 2010b).

In 2010, the Oregon Department of Agriculture completed a comprehensive status review of *Calochortus persistens* and proposed that this species be listed as Threatened in the State of Oregon, pursuant to Oregon Revised Statute 564.105 (Amsberry and Meinke 2010,

pp. 1-2, 17, 20.

SUMMARY OF THREATS:
The combination of restricted range, extremely low numbers (five plants) in one of three disjunct occurrences, poor competitive ability, short seed dispersal distance, slow growth rate, low seed production, apparently poor survival rates in some years, herbivory, habitat disturbance, and competition from exotic plants threaten the continued existence of this species. We find that *Calochortus persistens* is warranted for listing throughout all its range and, therefore, find that it is unnecessary to analyze whether it is threatened or endangered in a significant portion of its range

LISTING PRIORITY

THREAT			
Magnitude	Immediacy	Taxonomy	Priority
High	Imminent	Monotypic genus	1
		Species	2
		Subspecies/population	3
	Non-imminent	Monotypic genus	4
		Species	5*
		Subspecies/population	6
Moderate to Low	Imminent	Monotypic genus	7
		Species	8
		Subspecies/population	9
	Non-imminent	Monotypic genus	10
		Species	11
		Subspecies/population	12

___ Have you promptly reviewed all of the information received regarding the species for the purpose of determining whether emergency listing is needed? Yes

Rationale for listing priority number:
Magnitude:
The exotic weed, dyer's woad is a germination inhibitor that has either invaded or surrounded *Calochortus persistens* populations in approximately 75 percent of this species' known habitat on Gunsight-Humbug Ridge in California, the southern-most of three occurrences. Where dyer's woad is present, up to 10 percent of the habitat is covered by dyer's woad. Unaffected portions (approximately 24 percent of the habitat in California) can persist if no disturbance (e.g. fire suppression actions or off-road vehicle use) occurs. However, this area is one where the potential for fire suppression activities (e.g., fire line construction) is high and the resulting habitat destruction and disturbance resulting in dyer's woad invasion is high. Therefore, the

magnitude of this threat is high in one of three occurrences where this species is found. In the remaining two occurrences, dyer's woad does not presently represent a high magnitude of threat. Because an entire occurrence is threatened by this exotic weed, we have determined that the magnitude of this threat for the species remains high. In addition, because one of the three known disjunct occurrences is represented by only five plants, the magnitude of existing threats, including off-road vehicle damage or the potential for other disturbance or damage is high.

Immediacy:
On Gunsight-Humbug Ridge in California, where dyer's woad has affected *Calochortus persistens*, infestation levels are as high as 10 percent of the vegetation cover in 3 of 33 subpopulations. The majority of the occurrence is infested at five or less percent of the total vegetation cover. The amount of habitat affected by dyer's woad will likely increase at a gradual rate in areas where weeds haven't been completely removed. Removal of exotic weeds from roadsides and between populations has been accomplished over the last eight years. In addition, the likelihood that a large proportion of the Gunsight-Humbug Ridge range would be affected by disturbance, and therefore invaded by dyer's woad at the same time, is low. In the recently discovered Cottonwood Peak and Little Cottonwood Peak occurrence, the dyer's woad is presently confined to a localized area and is being chemically removed. Therefore, the main threat is not immediate.

Is Emergency Listing Warranted? At this time emergency listing is not warranted. The Fish and Wildlife Service and Forest Service have been working together for eight years to manually remove dyer's woad along the roadsides that allow access to the Gunsight-Humbug Ridge population. An agreement with the Siskiyou Department of Agriculture has resulted in chemical treatment of dyer's woad on private lands in the area. A cooperative agreement is being drafted among the Fish and Wildlife Service, Bureau of Land Management, and the Forest Service that when fully implemented, will reduce or remove the threats to *Calochortus persistens*.

DESCRIPTION OF MONITORING:

The Yreka Fish and Wildlife Office has been working with the Klamath National Forest to develop a conservation strategy for *Calochortus persistens* on Federal lands and to implement recovery actions for this species. Therefore, we have met frequently to discuss the draft conservation agreement, have participated in field surveys, and assisted with exotic weed treatments. As we draft and implement the conservation agreement, we continue to gather and review pertinent literature. Each year since this species was petitioned for listing, we have contacted the Siskiyou County Planning Department so that we can be apprised of any developments that are being planned for private lands where *C. persistens* occurs. Finally, we have contacted the Bureau of Land Management botanist to find out about the population status in Oregon. Therefore, we are monitoring both population status and threats across the range of this species.

COORDINATION WITH STATES:
State of California Department of Fish and Game (CDFG) staff are participating in several of the

conservation actions listed in the draft conservation agreement and are especially supportive of Federal cooperation with private landowners to rid the Cottonwood Peak and Little Cottonwood Peak occurrence of the localized occurrence of dyer's woad (Fallscheer 2008). CDFG staff will continue to conduct post-harvest visual monitoring of timber harvest on private lands within the Cottonwood Peak and Little Cottonwood Peak occurrence (Fallscheer 2009, 2010). State of Oregon Department of Agriculture/Oregon State University staff have reviewing the status of *Calochortus persistens* and have proposed that this species be listed as Threatened in the State of Oregon's (Amsberry and Meinke 2010, p. 1-2, 17, 20).

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APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes, including elevations or removals from candidate status and listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all resubmitted 12-month petition findings, additions or removal of species from candidate status, and listing priority changes.

Approve: _____
Regional Director, Fish and Wildlife Service Date 6-7-2010

Concur: _____
ACTING
Director, Fish and Wildlife Service Date: October 22, 2010

Do not concur: _____
Director, Fish and Wildlife Service Date

Director's Remarks:

Date of annual review: April 22, 2010
Conducted by: Nadine R. Kanim